IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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SEPARATOR FOR FLUIDS AND SOLIDS

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I. TITLE: *"SEPARATOR FOR FLUIDS AND SOLIDS"*

II. BACKGROUND OF THE INVENTION

1. Field of the Invention.

The present invention relates to a separator for fluids and solids, and more particularly, to a separator that does not use moving parts.

2. Description of the Related Art.

Many designs for treating gases have been designed in the past for the purpose of separating a particular gas from solids or liquids suspended in a physical mixture. The prior art devices use moving parts to avail themselves of the effect of centrifugal forces. Nor are the prior art devices suitable to be used in a continuous system. None of these designs have achieved the degree of success realized in the present invention with a relatively simple structure that is inexpensive to construct and maintain.

The closest prior art know to Applicant corresponds to U.S. patent No. 5,567,321 issued on October 22, 1996 to Weber, Rohr and Suter. The centrifugal filter discloses a rotatable traveling basket including holes and a rather complicated mechanism. However, the patented centrifugal filter uses moving parts and it would not work in a continuous system. Also, it does not work for gases such as those present in exhaust systems.

III. SUMMARY OF THE INVENTION

It is one of the main objects of the present invention to provide a separator for fluids and solids that does not use moving parts.

It is another object of this invention to provide a separator for fluids and solids that is easy to install and use, especially with internal combustion engines.

It is still another object of the present invention to provide a separator that does not require power or any source of energy other than the pressure applied by the fluid being processed.

It is yet another object of the present invention to provide a separator that can be used in a continuous system.

It is yet another object of this invention to provide such a device that is inexpensive to manufacture and maintain while retaining its effectiveness.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

IV. BRIEF DESCRIPTION OF THE DRAWINGS

With the above and other related objects in view, the invention consists in the details of construction and combination of parts as will be

more fully understood from the following description, when read in conjunction with the accompanying drawings in which:

Figure 1 represents an isometric view of one of the embodiments with a broken portion showing the interior of its housing for the separator object of the present invention.

Figure 2 shows a cross-sectional view of a wounded conduit 's portion, showing the disposition of the through openings.

V. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, where the present invention is generally referred to with numeral **10**, it can be observed that it basically includes housing **20**, wound conduit assembly **40,** inlet **44** and outlet **46.** In operation, a fluid to be processed (typically containing small particles or vaporized liquids in suspension) enters inlet **44** and exits through outlet **46**. One of the advantages of this invention is that it lends itself to be used in a continuous system, such as for treating the exhaust gases produced by an internal combustion engine.

As seen in figure 1, housing **20** has a substantial cylindrical shape with a concave bottom **22** including an opening **23** in its lowermost point. Wound conduit assembly **40** is mounted inside housing **20.**

Wound conduit assembly **40** includes a serpentine conduit member **42** with outermost wall portion **43.** Serpentine conduit member includes inlet **44** and outlet **46.** Outermost wall portion **43** has a plurality of through

openings **47**. In the preferred embodiment, openings **47** are formed at an angle to facilitate the exit of the heavier matter contained in the gas mixture, as best seen in figure 2.

The present invention can be implemented with different means for applying a pressure differential between inlet **44** and outlet **46** so that the fluid entering inlet **44** is forced through serpentine conduit member **42** and out through outlet **46.** The heavier matter contained in the fluid is forced radially out through openings **47** by the action of the centrifugal forces. In this manner, the resultant fluid that exits through outlet **46** is free of the heavier particles and/or liquids. The pressure differential can be enhanced with the application of a pressurized second fluid (such as air) through inlet **44** that causes the fluid being processed to speed up through member **42.**

The centrifugal force acting on the solids or heavier mater suspended in the fluid is represented with the following equation F $V^2/_R$ where V is the velocity of the fluid and suspended heavier matter and R is the radius of curvature.

In the embodiment shown in figure 1, the heavier matter passing through openings **47** is collected at bottom **22** passed through **23** for disposal or further processing.

One of the applications for the present invention is with internal combustion engines. The exhaust gases typically contain particles and oil vapors in suspension. Other industrial applications make also desirable

separating solids/liquids from fluids (liquids or gases), such as environmental, pollution control devices and others. Forcing the exhaust gases through serpentine conduit member **42** causes a centrifugal force that is proportional to the square of the to rotational speed at which the exhaust gases are traveling. The higher the pressure differential with respect to outlet **46**, the faster the gases will travel and the higher the magnitude of the centrifugal force. Also, the larger the radius of curvature of the wound conduit members, the smaller the centrifugal force.

Applicant has found that using a coil of 6.4 cm. in diameter for the wound conduit member and with a conduit member having an inner diameter of 1 cm., the pressure provided by typical internal combustion engines has been sufficient to impart the necessary speed to the fluid for the present invention to work.

Another application would be the use of the invention in polluted areas such as industrial smokestacks. In these applications, the polluted air can be compressed and injected to inlet **44** or alternatively a negative pressure is applied to outlet **46** to suck the polluted air.

One other possible application contemplates the use of the invention with pressurized gases, such as air, to separate water vapors and other particles.

Still another application involves a liquid fluid, such as oil, with small solids in suspension. The oil can be engine in transmission oil, for instance. The liquid is forced through inlet **44** in a similar fashion as discussed above.

The foregoing description conveys the best understanding of the objectives and advantages of the present invention. Different embodiments may be made of the inventive concept of this invention. It is to be understood that all matter disclosed herein is to be interpreted merely as illustrative, and not in a limiting sense.